Space Weather Forecast

Issued on Monday, 22 July 2024 at 13:09 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate-class X-ray flares likely. Chance of G1/Minor Storms Day 2 (23 July) but G3/Strong Storms Day 3 (24 July).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Activity has remained Moderate, with two low-level Moderate-class flares, either from a dynamic sunspot region in the northwest, peaking at or very near M1.5 at 21/0355UTC, or from a large spot near the middle of the Sun, peaking near the same intensity at 21/0834UTC. An impulsive M1 flare was also observed at 21/1630UTC from an area in the northeast quadrant, simultaneously accompanied by a filament lift-off. The ejecta was soon followed by a full halo on coronagraph imagery and while no Stereo image is available at the time of writing, this CME is believed to be Earth-directed and may arrive at the beginning of Day 3 (4 July) according to the initial analysis.

There are currently up to ten sunspot regions on the facing side. The largest and most complex region is in the southwest quadrant, close to the solar equator, and adjoins another relatively large sunspot region. Some regions display a fading trend and a couple of other regions have completely faded. The main change in this period is the rapid development of a region in the far east. The group is also preceded by another region which came out of nowhere, the two regions somewhat consolidating each other.

Solar Wind / Geomagnetic Activity: The solar wind showed a continuation of a slow regime. The speed, number of particles and their associated magnetic field were all within normal background ranges. The net result of the above solar wind measures was for provisionally Quiet geomagnetic indices.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate activity is likely throughout.

Solar Wind /Geomagnetic Activity: Two CMEs in the forecast. First one from 19 July arriving on Day 2 (23 July) with a chance of Chance of Minor Geomagnetic Storm (G1) and the second one from 21 July arriving at the beginning or early on Day 3 (24 July) with a chance of Strong Geomagnetic Storm (G3) conditions. Activity expected to gradually ease on Day 4 (25 July), with a slight Chance of Minor Geomagnetic Storm (G1)

Energetic Particles / Solar Radiation: The chances of solar radiation storms breaching S1 Minor levels show a daily slight chance in the period in response to any suitable X-ray flares, chiefly those emitted from the better-connecting western solar horizon.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	50	70	30
Strong	G3	No	1	2	30	5
Severe	G4	No	1	1	2	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	60	60	60
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	15	15	15	15
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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